NASAFacts

National Aeronautics and
Space Administration

Goddard Space Flight Center
Greenbelt, Maryland 20771
AC 301 286-8955

FS-1998 (01)-003-GSFC

Goddard Space Flight Center

History

The Goddard Space Flight Center (GSFC), named for Dr. Robert H. Goddard, a pioneer in rocket research, was established in 1959. Since that time, GSFC has played a major role in space and Earth science.

The Goddard team is made up of some of the world's premier scientists and engineers devoted to research in Earth science, space science and space communications. Goddard's fundamental mission is to expand knowledge of the Earth and its environment, the solar system and the universe through observations from space. To ensure the Nation maintains leadership in this endeavor, the Center is committed to excellence in scientific research and investigation, in the development of space systems and in the advancement of essential technologies.

GSFC Vision Statement

"We revolutionize knowledge of the Earth and the universe through scientific discovery from space to enhance life on Earth"

EOS AM-1 Spacecraft

Major Contributions

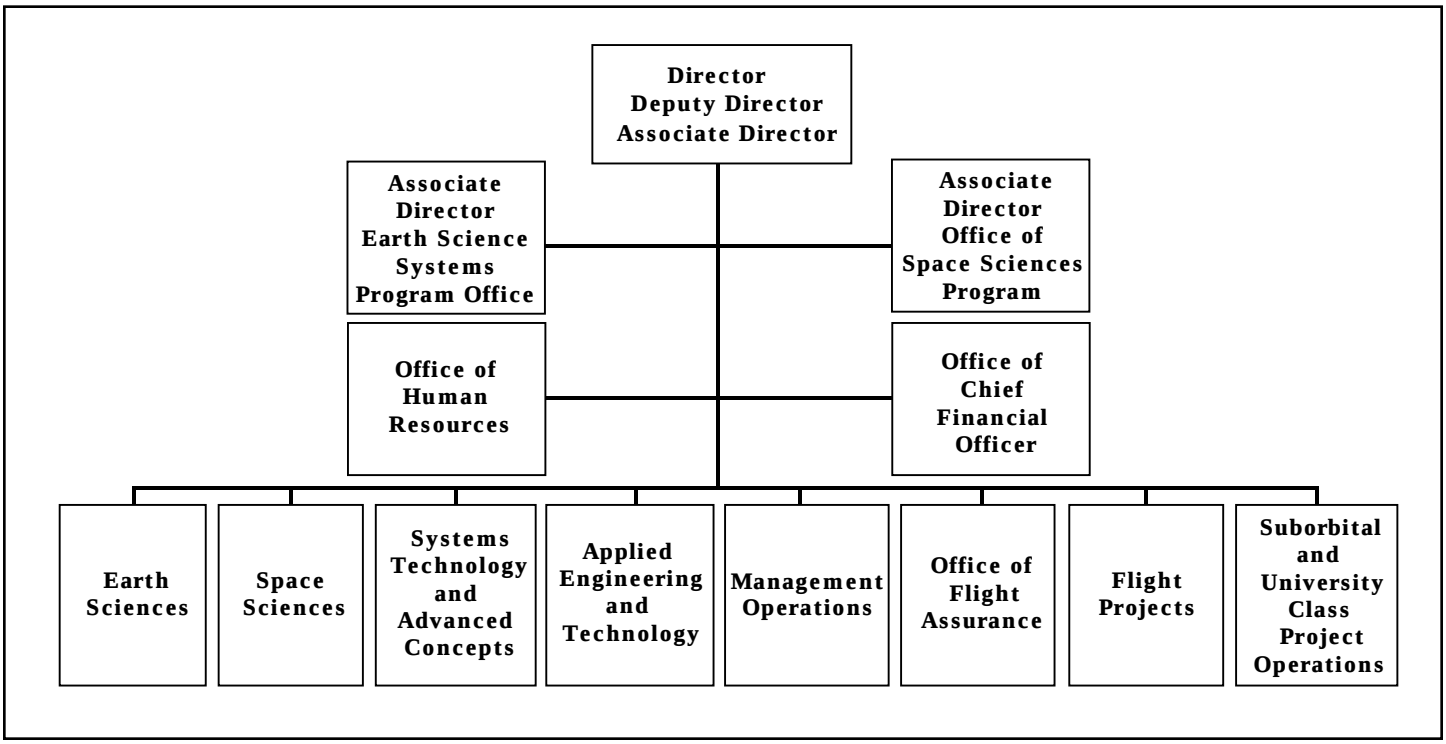
Goddard's role as a leader in technology and science is as alive today as it was in 1959 when Explorer VI, under Goddard project management, provided the world with its first image of Earth from space.

Goddard has overall responsibility for NASA's Earth Science Enterprise, NASA's long-term, coordinated research effort to study the Earth as a global environmental system. The Earth Observing System (EOS) is the centerpiece of this enterprise and is managed by Goddard. EOS will feature a series of polar-orbiting and low inclination satellites for global observations of the land surface, biosphere, solid Earth, atmospheres and oceans. The launch of the first EOS satellite, EOS-AM1, is scheduled for the summer of 1998.

The end product of the Earth Science Enterprise will be the ability to develop and implement strategies that will improve human interaction with the Earth's environment based on a better understanding of how our environment works. To develop that understanding, the Earth Science Enterprise will rely on the EOS Data and Information System (EOSDIS). The EOSDIS has been designed to archive, manage and distribute Earth science data worldwide.

One part of NASA's Earth Science Enterprise is the Tropical Rainfall Measuring Mission (TRMM) which launched on November 27, 1997. TRMM, a joint project between NASA and the National Space Development Agency of Japan (NASDA), is the first satellite designated to observe tropical rainfall. Goddard was responsible for providing the observatory, two of its five instruments, integration and test of the observatory and, the science data processing system. Goddard operates TRMM via the Tracking and Data Relay Satellite System (TDRSS).

In December 1993, Goddard managed what has been called one of the most challenging missions ever conducted by NASA, the highly successful first servicing mission of the Hubble Space Telescope (HST). The 11-day mission, which corrected the vision of the telescope's optical components, included five days of astronaut spacewalks to service the telescope in space. The second HST servicing mission occurred in February 1997. During this 10-day mission, astronauts installed two new instruments: the Near Infrared Camera and Multi-Object Spectrometer (NICMOS) and the Space Telescope Imaging Spectrograph (STIS). The HST also received a refurbished Fine Guidance Sensor (FGS) and a Solid State Recorder (SSR). Finally, astronauts added several thermal insulation blankets to Hubble to protect areas where the existing insulation was showing its age.



Since the second servicing mission, Hubble has been returning a wealth of images and science results.

Goddard is also the home of the Space Telescope Operations Control Center (STOCC). The STOCC is the nerve center for HST where all commands for the telescope originate. From this location, project managers and engineers control the observatory, retrieve data, and maintain an around-the-clock vigil of HST. The health and safety of HST, efficient operation and flight system engineering of the observatory also are the responsibility of Goddard. The Space Telescope Science Institute, a user facility where the scientific observing program is formulated on behalf of the astronomical community, is likewise managed by Goddard.

Goddard is also responsible for the procurement, development and verification testing of the Geostationary Operational Environmental Satellite (GOES) system. The GOES system consists of a series of geostationary weather satellites developed and launched by NASA for the National Oceanic and Atmospheric Administration (NOAA). The GOES satellites are the same satellites that provide the pictures for television news weather reports.

The latest GOES satellite, GOES-10, was launched on April 24, 1997, where it joined its predecessors GOES-8, launched in April 1994, and GOES-9, launched in May 1995. The GOES-10 satellite, is being stored "on-orbit" until the aging GOES-8 spacecraft is deactivated. Currently, the GOES-9 spacecraft is positioned to view the western United States, West Coast, Hawaii, Alaska and the Pacific. It provides atmospheric images, temperature and humidity profiles, wind velocity data and severe storm coverage of the Earth's western hemisphere. The new series of GOES satellites have greatly improved weather forecasting by providing state-of-the-art weather images and atmospheric sounding information.

Goddard Technology

The NASA Goddard Space Flight Center is a national leader in the development and utilization of cutting edge technology. Because of the Center's vital role in our Nation's space program, employees of GSFC have gained significant expertise in areas such as detector development, optics, cryogenics, microelectronics, X-ray astronomy, communications, Earth observation and information systems.

Goddard's leadership in detector development has included trailblazing work. Detectors are used to determine the presence of electromagnetic waves or high energy particles and are the essential elements of virtually all scientific instruments. Goddard scientists and engineers have pioneered advanced detector technology, including work with Cadmium Zinc Telluride (CdZnTe), a new semiconductor material. The CdZnTe technology was developed to accurately locate gamma-ray bursts, determine their distance scale, and measure the physical characteristics of the emission region. Goddard engineers also have significantly advanced far infrared detector technology, and have developed a miniature light source to accurately calibrate detectors in the visible and infrared wavelengths.

Technological advancements impact the world. For example, advancements in detector technology have enabled improvements in various medical instrumentation. For example, during X-ray procedures, patients may receive lower doses of radiation with increased early detection capability because of advancements of detector sensitivity. Other commercial applications of Goddard's detector technology have included environmental monitoring, industrial manufacturing, criminal investigations, night vision applications, energy efficiency monitoring and weather monitoring systems.

Organization

The Center is comprised of a system of directorates. The directorates and their functions are as follows:

- Office of the Director - Provides overall management and coordinates control over the diversified activities of the Center. Coordinating the Center's space science program activities is the Associate Director for Space Science Programs. The Earth Science Systems Program Office (ESSPO), coordinated by the Associate Director of Earth Science Systems, leads NASA in its goal to advance the understanding of the Earth system on a global scale. Supporting the Center's organizational and programmatic responsibilities are the Office of Human Resources and the Office of the Chief Financial Officer.
- Management Operations - Provides business and institutional support and services necessary for the successful accomplishment of the Center's Earth science, space science, and technology management activities.
- Office of Flight Assurance - Responsible for safety, reliability and quality assurance programs to ensure flight mission success. This includes the control of electronic parts, materials and processes. The directorate also is responsible for independent design reviews of technical and flight safety aspects of spacecraft and instruments.
- Flight Projects - Plans, organizes, and directs the management of the Center's major flight projects, new start studies, international projects, and the small and medium class expendable launch vehicles.
- Systems Technology and Advanced Concepts - Provides a full range of engineering discipline expertise needed to enable end-to-end conceptualization, development, and use of Earth and space science missions, including the delivery of appropriate science products. Provides leadership and vision to advocate and implement a broad range of advanced technology activities in appropriate discipline areas in order to meet current and future space and Earth science mission needs.
- Applied Engineering and Technology - Provides agencywide management of areas of technology development for near Earth orbiting missions; provides agencywide management of Small Business Innovation Research (SBIR) and Small Business Technology (STTR) programs; and provides oversight management and administrative support for the External Institute for Advanced Concepts.
- Space Sciences - Enables major elements of the national space science program associated with the study of the solar system, the galaxy and the universe, through the conduct of theoretical studies, data analysis and the development of projects and technologies for spaceborne instrumentation.
- Suborbital Projects and Operations - Responsible for the overall management, operation and support of NASA's sounding rocket and balloon programs and the conduct of aeronautical research. This function is located at the Wallops Flight Facility, Wallops Island, Virginia.
- Earth Sciences - Conducts scientific studies in the Earth sciences leading to a better understanding of processes affecting global change and the distribution of natural resources through research, development and application of space technologies.

Workforce

Approximately 11,870 persons work at the Goddard Space Flight Center at all of its sites. This number includes 3,354 civil servants and 8,516 contractor personnel (Greenbelt, Maryland - 3,086 civil servants and 7,798 contractor personnel; Wallops Island, Virginia - 249 civil servants and 687 contractor personnel; Goddard Institute for Space Studies in New York, New York - 19 civil servants and 31 contractor personnel). Of this number, 3,205 civil servants and 7,478 contract personnel reside in the State of Maryland.

Total GSFC Workforce - January 1998

	Civil Servants	Contractor Personnel
Clerical	281	298
Professional/ Administrative	788	1,667
Scientist/ Engineer	1,958	4,761
Technician	262	1,079
Wage Grade	65	711
Total Workforce	3,354	8,516

Facilities

There are 32 major buildings, providing approximately 3,200,000 square feet (292,600 square meters) of space, located in Greenbelt, Md, situated on approximately 1,270 acres (514 hectares). As the lead NASA center for Earth Sciences, Goddard constructed the Earth Observing System Data Information System (EOSDIS) facility. The EOSDIS accommodates personnel working on a five-shift, 24-hours-a-day, 365 days a year basis. EOSDIS provides approximately 190,000 gross square feet (17,651 square meters) of office and data processing and archiving space.

This facility serves as a key data retrieval node in the Earth Observing System (EOS) communications system as well as a distribution center for Earth data from numerous sources, such as the Total Ozone Mapping Spectrometer and Tropical Rainfall Measuring Mission. The facility houses systems necessary for overall management of the EOS ground system and the largest of eight nationwide Distributed Active Archive Centers necessary for archiving a significant portion of the EOS observational data. It also governs the mission operations and instrument control center functions needed to monitor and control the EOS space platforms and their suite of instruments while in Earth orbit.

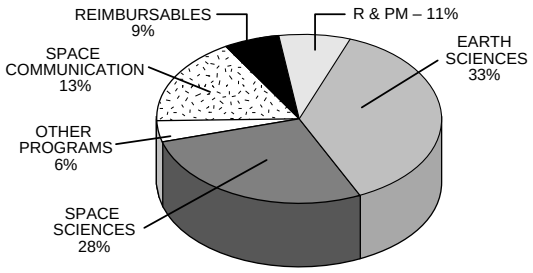
A future facility currently under construction and projected for completion in June 1998 is the Earth Systems Science Building (ESSB), which will accommodate approximately 770 day-shift civil servant and contractor personnel. The building will include 237,000 gross square feet (22,000 square meters) of space and will house the current employees of Goddard's Earth Sciences Directorate.

Goddard's Greenbelt campus has personnel and facilities to create, build, test, launch and operate various satellite projects in support of Earth science, space science and advanced technology programs.

For a more detailed view of GSFC's facilities and services, visit the Facilities Management Division Homepage at http://panza.gsfc.nasa.gov/220/newfmdhm.html

Budget

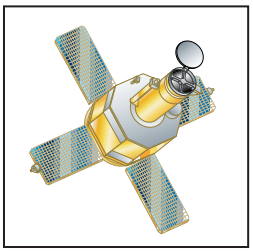
As illustrated in the pie chart below, the Goddard budget was approximately $3.037 billion for fiscal year 1997.



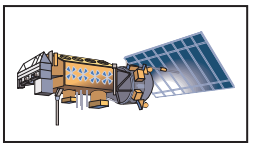
(NOTE: THIS REPRESENTS FY97 PROGRAM AUTHORITY RECEIVED IN FY 97)

	FY 1997 (IN MILLIONS OF $)
EARTH SCIENCE	$1,032.9
SPACE SCIENCE	$836.8
SPACE COMMUNICATIONS	$396.2
OTHER PROGRAMS	$171.7
R&PM	$334.5
SUBTOTAL DIRECT APPROPRIATIONS	**$2,772.1**
REIMBURSABLES	$265.2
TOTAL	**$3,037.3**

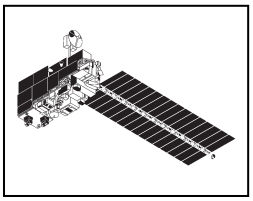
1998 Goddard Programs and Launches



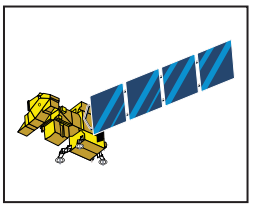
TRACE - The Transition Region and Coronal Explorer, developed under the Small Explorer Program (SMEX), is scheduled to launch in March 1998. TRACE will explore the three-dimensional magnetic structures which emerge through the visible surface of the Sun: the Photosphere, the Transition Region and the Corona.



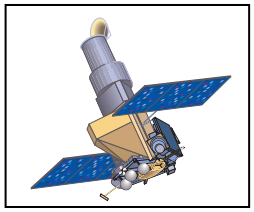
NOAA-K - The first in a series of new weather satellites, NOAA-K, is scheduled to be launched aboard a Titan II rocket from Vanderberg Air Force Base, Calif., in May 1998. The Polar Operational Environmental Satellites (POES) provide long range weather forecasting and are a cooperative effort between NASA, NOAA, the United Kingdom and France.



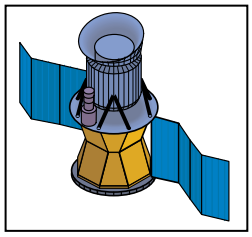
EOS AM-1 - EOS AM-1, the first Earth Observing System (EOS) mission is scheduled to launch in the summer of 1998. The overall science objective of this mission is to gain an understanding of all Earth's environmental factors, including land, water and air. EOS AM-1 will launch aboard an Atlas II rocket from Vandenberg Air Force Base in California.



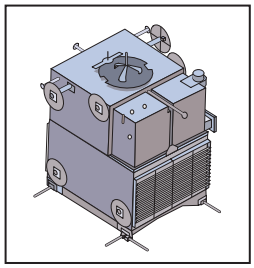
Landsat-7 - The Landsat-7 mission will provide images of the Earth's continental surface, a continuation of the more than 25-year record of images provided by previous Landsat satellites. Landsat-7 is scheduled to launch in late summer 1998 aboard a Delta II launch vehicle from the Western Test Range at Vandenberg Air Force Base, Calif.



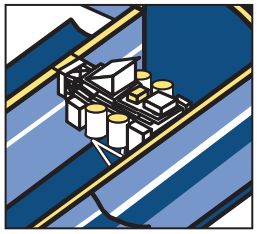
FUSE - The Far Ultraviolet Spectroscopic Explorer (FUSE) mission is scheduled to launch in the fall of 1998 aboard a Delta II Rocket. FUSE is part of NASA's Origins program and will explore the origin of our universe.



WIRE - The Wide-Field Infrared Explorer (WIRE) is scheduled to launch in September 1998 aboard a Pegasus XL rocket from Vandenberg Air Force Base, Calif. WIRE, a part of the Small Explorer Program (SMEX), is designed to study the evolution of starburst galaxies.



Spartan 201 - Spartan 201 will launch on the STS-95 mission scheduled for October 1998. Spartan 201 is an orbiting spacecraft that is deployed by the Space Shuttle and retrieved on the same mission. Spartan 201 will investigate the solar complexities of the universe.



Hitchhiker/GAS -Various Goddard Hitchhiker (HH) and Get Away Special (GAS) experiments will launch in 1998 on the following STS missions: STS-88 - 3 HH; STS-89 - 4 GAS, STS-90- 3 GAS; STS-91 - 7 GAS, 1 Space Experiment Module (SEM); STS-95 - 9 HH; and STS-96 -1 HH

Major Contractors at Goddard, Greenbelt, Maryland

Allied-Signal Technical Services Corp.
Lockheed Martin Corp.
McDonnell Douglas Corp.
Hughes Aircraft Company
Hughes Information Technical Corporation
TRW, Inc.
Swales & Associates, Inc.
Hughes STX Corp.
Santa Barbara Research Corp.
Aerojet General Corp.
ITT Corp.
Ball Corp.
Raytheon Services Company
Space Systems Loral, Inc.
Jackson & Tull, Inc.
Silicon Graphics, Inc.
Cortez III Services Corporation
NSI Technology Services Corp.
KPMG Peat Marwick Company
Unisys Corp.
CTA, Inc.
Brown & Root Services Corp.
Fairchild Space & Defense Corp.
Cray Research, Inc.
QSS Group, Inc.